

DOI 10.26724/2079-8334-2023-1-83-7-10
UDC 618.19:922-008.09-441

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SOME INDICATORS OF CARDIAC FUNCTION AND QUALITY OF LIFE IN PATIENTS WITH BREAST CANCER AND ITS COMPLICATIONS

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The purpose of the study was to assess heart rate variability and quality of life in patients with breast cancer and its complications. 115 patients with breast cancer were involved. The patients were divided into two groups - the main group, 45 patients with metastatic breast cancer with lymph node involvement, and the control group, 70 patients without lesions of the lymph nodes. ECG Holter monitoring and questionnaires adopted by the European Organization for Research and Treatment of Cancer were used in both groups. Statistical processing was carried out using the STATISTICA for Windows 7.0. Statistically significant differences relative to the control group were revealed in patients with lymph stasis on the scales "Insomnia" and "Dyspnea" (25.7 ± 2.73 and 42.2 ± 3.42 , $p=0.003$; 16.2 ± 2.12 and 34.8 ± 4.49 , respectively, $p=0.001$). In patients of the main group, a rare single VE prevailed— 594.3 ± 3.35 , versus 484.1 ± 2.96 , the frequency registered in the control group ($p=0.001$). Thus, there is the relationship between the breast cancer, and the quality of life of patients, this relationship is even more significant in the development of metastatic lesions of the lymph nodes.

Key words: breast cancer, lymph stasis, quality of life, extrasystoles

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ДЕЯКІ ПОКАЗНИКИ СЕРЦЕВОЇ ФУНКЦІЇ І ЯКОСТІ ЖИТТЯ У ПАЦІЄНТОК ІЗ РАКОМ МОЛОЧНОЇ ЗАЛОЗИ ТА ЙОГО УСКЛАДНЕННЯМИ

Метою дослідження було вивчення показників варіабельності серцевого ритму та якості життя у хворих на рак молочної залози та його ускладненнями. Було залучено 115 пацієнток з раком молочної залози, які були розділені на дві групи – основну, 45 хворих на метастатичний рак молочної залози з ураженням лімфовузлів, та контрольну, 70 пацієнток без уражень лімфатичних вузлів. Застосовувалося холтерівське моніторування ЕКГ, а також метод анкетування за допомогою опитувальників Європейської організації з дослідження та лікування раку. Для статистичної обробки використовували пакет STATISTICA для Windows 7.0. У пацієнток з лімфастазами були відмінності з контрольною групою за шкалами «Безсоння» та «Задишка» ($25,7 \pm 2,73$ та $42,2 \pm 3,42$, $p=0,003$; $16,2 \pm 2,12$ та $34,8 \pm 4,49$ відповідно $p=0,001$), частіше на тлі розвитку метастатичних уражень лімфатичних вузлів. У пацієнток основної групи переважала рідкісна одиночна шлуночкова екстрасистола: $594,3 \pm 3,35$, проти $484,1 \pm 2,96$ групи контролю ($p=0,001$). Таким чином, існує взаємозв'язок між раком молочної залози і якістю життя пацієнток, причому ця залежність ще більш значуща проявляється при розвитку метастатичних уражень лімфатичних вузлів.

Ключові слова: рак молочної залози, лімфастази, якість життя, екстрасистоли

In the structure of the incidence of malignant neoplasms in the female population, breast cancer, the incidence of which can reach 20–65 % of all detected malignant neoplasms, occupies a leading position [4, 7], which predetermines the increased interest of specialists from all countries working in this field, not only to issues of prevention and timely diagnosis, but also to ways to optimize medical and social rehabilitation measures [5, 12].

Along with a certain increase in morbidity, this contingent of patients is characterized by a high risk of regional complications associated with pathological disorders in the state of the lymphatic system [6]. In general, the oncological disease significantly reduces the quality of life of patients, including the level of general health, often leading to disability and mortality [2].

In turn, the study of the quality of life, which is an objective indicator based on subjective perception, allows a thorough analysis of the physiological, psycho-emotional and social components of human life. Taking into account the above aspects, we planned and carried out these scientific studies.

The purpose of the study was to determine heart rate variability and quality of life in patients with breast cancer and its complications.

Material and methods. We used data from a survey of 115 patients with breast cancer and metastatic lesions of the lymph nodes who were treated at the Republic Oncological Center, divided into two groups - the main group, 45 patients with metastatic breast cancer with lymph node involvement and control, 70 patients without lesions of the lymph nodes. The average age of the patients ranged from 30 to 60 years and older.

To achieve the set goals and solve the problems of the study, a set of atraumatic, minimally invasive, highly informative instrumental diagnostic methods were used. The main methods used in these studies were ECG Holter monitoring, which was carried out in two groups of patients with breast cancer, in the main and control groups. Complex research methods also included: questioning, anamnesis, physical examination, clinical and biochemical blood tests. Holter (daily) ECG monitoring (HM ECG) is, in essence, a method of recording the electrical activity of the heart during the patient's usual activity.

In the present work, when establishing indications for HM ECG, the criteria of the American Heart Association (Mond HG, 2017) were used, according to which, an indication for HM ECG is the presence of complaints associated with cardiac arrhythmias in the patient. Daily evaluation of complaints was carried out in the form of diary entries. Some electrophysiological parameters of the conduction system of women with breast cancer and complications in the form of metastatic lesions of the lymph nodes obtained by HM ECG were analyzed: the frequency of ventricular (VE) and supraventricular (SVE) extrasystoles, as well as their total number. To assess the physical and psycho-emotional state of the examined patients burdened with severe somatic pathology, and, in general, the quality of life, questionnaires widely used in medicine were used in our research.

To assess the condition of cancer patients, we used a questionnaire method using questionnaires adopted by the European Organization for Research and Treatment of Cancer (EORTC). The questionnaire was completed using official versions of the EORTC QLQ-C30/BR23 questionnaires (a questionnaire approved by the European Organization for Research and Treatment of Cancer in 2005). Questionnaire QLQ-C30, version 3.0, is common for all cancer patients and consists of 30 questions that characterize three scales: functioning scale, symptom scale, general health status of the patient (quality of life, QL).

Statistical processing of the results of the study was carried out on a personal computer, to analyze the clinical data obtained during the study, the STATISTICA for Windows 7.0 system was used, which is an integrated data processing environment. Comparison of the studied quantitative parameters (age, tumor localization, indicators of the quality of life of patients according to the questionnaires in the study groups) was carried out using the Wilcoxon-Mann-Whitney criteria. Descriptive statistics of quantitative traits included an estimate of the arithmetic mean, standard deviation, error of the mean, minimum and maximum. Statistical analysis of qualitative indicators of the quality of life-based on the results of the questionnaire survey was carried out on the basis of data grouped in analytical contingency tables, using Pearson's χ^2 test. For the mathematical processing of the survey results, the EORTC QLQ-C30 Scoring Manual for EORTC QLQ-C30/BR23 was used. The value of $p < 0.05$, generally accepted in medicine, served as a criterion for the statistical significance of the findings.

Results of the study and their discussion. In the course of the study, to assess the condition of patients with breast cancer, a questionnaire method was used using specialized questionnaires proposed by the European Organization for Research and Treatment of Cancer (EORTC). An important component of this field of scientific and practical medicine is the use of the QLQ-BR23 questionnaire, designed for use in various diseases and methods of treatment and prevention, which, in combination with the QLQ-C30, can provide practically detailed information necessary for assessing the quality of life status with oncological diseases and their complications.

Statistically significant differences relative to the control group were revealed when assessing the quality of life of patients with lymph stasis on the scales "Insomnia" and "Dyspnea" (25.7 ± 2.73 and 42.2 ± 3.42 , $p = 0.003$; 16.2 ± 2.12 and 34.8 ± 4.49 , respectively, $p = 0.001$), which were observed more often in the main group (Table 1).

Table 1

Data on the scales of the EORTC QLQ-C30 questionnaire in patients with breast cancer

EORTC QLQ-C30	Control group (n=70)	Main group (n=45)	P
Dyspnea	16.2±2.12	34.8±4.49	0.001*
Insomnia	25.7±2.73	42.2±3.42	0.003*
Loss of appetite	9.5±1.81	19.3±2.90	0.005*
Constipation	6.7±1.61	14.8±2.50	0.005*
Diarrhea	5.2±1.46	4.4±1.71	0.728
Financial difficulties	13.8±2.30	29.6±3.22	0.001*

Note: *—the difference in the index is statistically significant relative to the main group ($p < 0.05$) (according to the Mann-Whitney U-test)

Reliable distinguishing features were also recorded according to the indicators of the scales characterizing "Loss of appetite" and "Constipation" (9.5 ± 1.81 and 19.3 ± 2.90 , $p = 0.005$; 6.7 ± 1.61 and

14.8±2.50, respectively, $p=0.005$), and as for “Financial difficulties”, they were also noted much more often in the group of patients with complications of breast cancer (13.8±2.30 and 29.6±3.22, respectively, in the control and main groups, $p=0.001$).

In a comparative statistical analysis of the obtained digital data in the control group, the indicators for the “Assessment of future prospects” domain, which characterizes more the emotional state of patients burdened with breast cancer, were recorded at values significantly higher than those in the main group. When questioning patients using the questions included in this profile, there is a significant difference between the groups – 58.6±2.58 and 46.7±2.68, $p=0.003$.

The presence of a feeling of depression and anxiety was observed according to the results of the functional scale that determines “Sexual activity”, more often in the control group, where relatively higher statistically significant indicators were noted: 18.1±2.00 and 6.7±2.01, respectively, in the control group and main groups, $p=0.001$. A similar picture in the intergroup comparison of the obtained digital data is also observed on the “Body Image” scale (85.0±0.75 and 58.9±1.14, respectively, $p=0.001$).

Patients aggravated with breast cancer with metastatic lesions of the lymph nodes were characterized by lower quality of life indicators in terms of satisfaction with their appearance and sexual activity. When analyzing heart rhythm disturbances according to the classification, it was found that in the main group of patients with complications of breast cancer, the total indices for the frequency of fixing clinical symptoms of SVE amounted to 575.8±2.71, while in the control group, composed of 45 patients with lymph stasis, registered during the day, the mean data turned out to be much higher and were determined as 695.5±3.41 ($p=0.001$) (Table 2).

Table 2

Frequency of occurrence of extrasystoles per day in patients with breast cancer (M±m)

Indices	Atrial fibrillation		P
	Control (n=70)	Main (n=45)	
Single SVE	542.7±2.71	653.0±3.43	0.001
Paired SVE	22.9±0.13	28.7±0.18	0.001
Group SVE	10.2±0.10	13.8±0.10	0.001
Total number of SVE	575.8±2.71	695.5±3.41	0.001
Single VE	484.1±2.96	594.3±3.35	0.001
Paired VE	21.8±0.13	25.7±0.14	0.001
Total number of VE	505.9±2.95	620.0±3.34	0.001
Sum of SVE and VE	1081.8±3.92	1315.4±5.37	0.001

Note: P–statistical significance of differences between group (Mann-Whitney U-test).

At the same time, the occurrence of frequent VE, SVE, or atrial fibrillation can serve as an important diagnostic criterion for the unfavorable course of both the oncological pathology itself and its complications, which is confirmed by the results of studies conducted by other authors, according to which, during HM ECG, the statistical “norm” is considered to be approximately up to 200 supraventricular extrasystoles and up to 200 ventricular extrasystoles per day. It should be noted that, against the background of the development of metastatic lesions of the lymph nodes, in patients of the main group, a rare single VE prevailed – 594.3±3.35, versus 484.1±2.96, the frequency of occurrence of the studied factor registered in the control group ($p=0.001$). The so-called group extrasystoles, characterized by the fixation of 3–5 extrasystoles in a row, are detected in groups in almost the same number of cases, but a little less often in the absence of complications from the lymphatic system during the development of breast cancer, that is, in the control group (10.2±0.10 and 13.8±0.10, respectively, in the control and main groups, $p=0.001$).

Thus, in persons of the main group, in a relatively large number of cases, rare single extrasystoles are recorded and paired and group SVE and VE are less often observed.

Given that the frequency characteristics or components of heart rate variability reflect the state of its autonomic control or the balance of autonomic regulation, in our case we can talk about a certain role of oncological pathology and its complications in the genesis of disorders in the activity or in the functional state of the cardiovascular system, which indicates the need for additional highly informative diagnostic measures, in particular with the use of Holter monitoring, in the management of cancer patients.

The use of HM ECG methods significantly expands the understanding of cardiac arrhythmias that occur in patients with breast cancer and its complications. It became clear that in women, against the background of the occurrence and development of lymph stasis against the background of the studied oncological pathology, there are constant and negative changes in the body, which certainly affects the functional state of various organs and systems and, in particular, determines significant heart rate variability.

Thus, ventricular extrasystoles, identified during HM ECG as the most common ventricular arrhythmia, was associated by us, against the background of a decrease in the number of effective ventricular contractions, with the development of breast cancer and its complications, in which SVE, VE, which certainly leads to a relatively frequent occurrence of ventricular arrhythmias here than in patients with an isolated oncological disease. The data we obtained on the structural components of the quality of life correlate with the results of a number of scientific studies [3, 8, 11], which demonstrated that in patients with breast cancer aggravated by complications in the form of lesions of the lymphatic system, complex disorders in the physical and emotional state occur significantly more often compared to patients control group without such complications [9,10]. Thus, in the course of our studies, in terms of the quality of life of patients, a tendency was recorded for a deterioration in their perception of the appearance of their own body, which is consistent with the data of other authors who also use the EORTC QLQ-C30 and EORTC QLQ-BR23 questionnaires to assess the quality of life of women with breast cancer [1].

Conclusions

1. Statistically significant differences relative to the control group were revealed in patients with lymph stasis on the scales “Insomnia” and “Dyspnea” (25.7 ± 2.73 and 42.2 ± 3.42 , $p=0.003$; 16.2 ± 2.12 and 34.8 ± 4.49 , respectively, $p=0.001$).

2. Against the background of the development of metastatic lesions of the lymph nodes, in patients of the main group, a rare single VE prevailed— 594.3 ± 3.35 , versus 484.1 ± 2.96 , the frequency of occurrence of the studied factor registered in the control group ($p=0.001$).

3. The group extrasystoles are detected a little less often in the absence of complications from the lymphatic system (10.2 ± 0.10 and 13.8 ± 0.10 , respectively, in the control and main groups, $p=0.001$).

Statistical analysis of the clinical material showed a certain relationship between the development of oncological pathology, in particular breast cancer, and the quality of life of patients, which can also be considered as a prognostic criterion, and this relationship is even more significant in the development of metastatic lesions of the lymph nodes.

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Стаття надійшла 12.02.2022 р.